# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
# REGULATORY CONTACT RECORD

---

**Date/Time:** June 2, 2000/ 3:30 PM

**Site Contact(s):** Richard Lesser / Ted Hopkins
**Phone:** (303) 966 - 2298

**Regulatory Contact:** Mark Aguilar
**Phone:** (303) 312 - 6251

**Agency:** USEPA Region VIII

---

**Purpose of Contact:** This contact record documents concurrence for the management of PCB waste under the 1998 Megarule in Building 776/777

---

**Discussion**
Building 776 / 777 staff proposed a strategy for management of TSCA wastes being generated during on - going deactivation and decommissioning activities. The strategy allows PCB items which are no longer in service, but which nevertheless are still wired to their electrical infrastructure, to remain in place until their slated decommissioning under Building 776/777's DOP. The strategy is presented below. After completion of a building walk – down, regulator oversight concurred that pre-emptive removal is not required, and the PCB items may be managed per the conditions attached.

The PCB management strategy, and its conditions, is:

- RFETS personnel shall apply the standard PCB Mark (cf. 40 CFR § 761) for all transformers and capacitors which need carry such a label.
- Additional PCB items which may be later identified during deactivation and decommissioning (such as the rectifiers identified in 776/777), which need not carry the PCB Mark, will be labeled "PCB Remediation Waste". As a precautionary measure (per Francis Tran of USEPA Region VIII), all such large items will be labeled with the yellow PCB Mark.
- Removal of PCB items from contaminated areas of Type 2 and Type 3 buildings is not required at this time, given CERCLA's § 121 (d) (4). The PCB items will be removed when expeditious, and/or at the time of deactivation and decommissioning.
- Any newly discovered PCB items in the non-contaminated areas of Type 2 buildings, as well as PCB items which may be discovered in Type 1 buildings or exterior to buildings, need be managed in full administrative and procedural compliance with

the labeling, inspection, and engineering standards associated with PCBs in 40 CFR § 761.

- ❑ All PCB items shipped from RFETS for off-site disposal must comply with all administrative and substantive requirements of TSCA once off-Site.

---

**Contact Record Prepared By:** Richard Lesser

---

Required Distribution:
D. Grosek, RFFO
R. DiSalvo, RFFO
C. Burbach, CDPHE
F. Phillips, K-H
K. North, K-H ESS
W. Wierzbicki, K-H ESS
T. Hopkins, 776
J. Wrapp, 371
R. Leitner, 771
K. Lavorato, 707
S. Nesta, RISS
J. Berardini, MS
A. Rosenman, K-H ESS

Additional Distribution:
_Mark Aguilar_____
_Edd Kray_____
_Steve Dahlgren_____
_Mark Crocker_____
_Wayne Sproles_____
_Ed Blush_____
_Mark Ferri_____

# *Characterization of PCB Items in 776/777*

## *Introduction*

The recent identification of previously unrecognized polychlorinated biphenyl (PCB) items in Buildings 776/777 dictated that a building – wide reconnaissance for PCB items be performed. This white paper

1. presents the results of the reconnaissance,
2. establishes the criteria used in the evaluation of suspect PCB items,
3. develops the statutory and regulatory foundation for on-going management of additional newly discovered PCB items, and
4. recommends that concurrence be obtained from the appropriate regulatory agencies for use of specified exemptions from administrative, non-substantive requirements.

PCBs are subject to regulation under the Toxic Substances Control Act (TSCA) 15 U.S.C.A. §§ 2601 to 2692, and at 40 CFR § 761. TSCA's regulatory requirements include periodic inspections of specified items while in–use or in storage for disposal, as well as engineering controls while in use or in storage for disposal. However, PCB items may be located at facilities currently subject to regulation under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which contains statutory exemptions from requirements specified in other environmental statutes. Importantly for Buildings 776/777, the deactivation and decommissioning process has been initiated under a Decommissioning Operations Plan (DOP), a CERCLA decision document. In the DOP, PCBs were identified, and provisions established to comply with all applicable, appropriate and relevant TSCA requirements.

A total of thirty-two (32) PCB items were identified in this reconnaissance. Some of these items had been previously identified, but a number were newly identified by this reconnaissance. Items include transformers, capacitors, and rectifiers; PCB ballasts are likely present in many of the fluorescent fixtures, but they were not inventoried. Many PCB items are located in Radiologically Contaminated Areas, and must be presumptively managed as if they are themselves radiologically contaminated.

It is recommended that a discussion be held with both Lead Regulatory Agencies (LRAs) to obtain concurrence that CERCLA's statutory waivers are applicable to PCB management in Buildings 776/777, and by extension throughout the Rocky Flats Environmental Technology Site (RFETS).

## *Characterization of Transformers: Air versus liquid dielectrics*

Transformers are electrical devices which change the voltage potential in an electronic circuit. Electricity is commonly transmitted at thousands of volts over high power lines, but industrial plants and typical electrical fixtures typically need voltages of 220 Volts (V) and 110 V, respectively. Thus, transformers are used to 'step down' for the electrical consumer the high voltages associated with efficient transmission of electricity over long distances to yield useable voltages.

Transformers can also serve to 'step up' voltages. For example, welding devices in 776/777 used electron beams accelerated through thousands of volts of electrical potential to effect fine welds between components. Transformers 'stepped up' 220 V circuits to the thousands of volts needed for the device. There are two electron beam welders in 776/777.

In use, transformers can generate significant quantities of heat. Transformers are cooled by heat transfer through one of two dielectrics: gas or liquid. These coolants have the secondary function of providing electrical insulation between individual components within the transformers. Circulation of

ambient air is the most common type of gas cooled transformer. Mineral oil is the most common dielectric fluid in use today, but pre–1979 liquid cooled transformers commonly used PCBs.

Transformers which are liquid cooled exhibit four characteristics:

1. An inlet port, for introduction of fresh dielectric
2. A drain valve or pipe, for removal of spent dielectric
3. A heat exchanger, which for larger transformers necessitates cooling fins or radiators
4. Sealed housings, so that the dielectric does not leak

Prior to 1979, liquid transformers were commonly filled with PCB liquids, as PCBs had advantages of low cost, high resistance to electrical current, and thermal stability. Environmental considerations associated with PCBs prompted Congress to declare, effective on January 1, 1978, that "no person may manufacture, process, or distribute in commerce or use any polychlorinated biphenyl in any manner other than a totally enclosed manner."[1] TSCA defines a "totally enclosed manner" as "any exposure of human beings or the environment . . . will be insignificant as determined by the Administrator by rule", and also allows the US Environmental Protection Agency (USEPA) Administrator to authorize use if the Administrator finds that "manufacture, processing, or distribution in commerce or use will not present an unreasonable risk of injury to health or the environment."[2]

For transformers manufactured immediately prior to the passage of TSCA, PCBs were almost universally used as the dielectric fluids of choice. The USEPA requires that any transformer, manufactured prior to July 2, 1979, that contains more than 3 pounds of fluid other than mineral oil, must be assumed to contain high concentrations of PCBs.[3]

Air cooled transformers exhibit three characteristics:

1. No inlet port for the maintenance of dielectric fluid levels.
2. No drain valve.
3. A vented, unsealed bottom and and/or top for the circulation of air.

Air cooled step – down transformers are typically smaller units where the more elaborate, and expensive, liquid dielectric design is not needed. Air cooled step – down transformers are typically used for voltages below 480 V, and are nearly universal at voltages less than 220 V. Similarly, step–up transformers can transfer current from 110 or 220 V up to 5 kV using air cooling configurations; only special application step up transformers working within this range are expected to contain dielectric fluid.

The vast majority of transformers (approximately seventy-five) currently located in Buildings 776/777 are air cooled. Only six transformers currently located in Buildings 776/777 need be classified as PCB transformers.

***Characterization of Capacitors, air filled versus liquid dielectric***

Capacitors are electrical devices which hold, or store, electrical energy. This storage capacity can be put to use in one of two ways:

1. The capacitor can be used to 'kick – start' electrical units, such as motors or fluorescent lights.
2. The capacitor can be used to attenuate, or dampen, power surges by absorbing electrical energies and thus protecting more sensitive electronic components.

---

[1] TSCA § 2605 (e) (2) (A)
[2] TSCA §§ 2605 (e) (2) (B) and (C).
[3] 40 CFR § 761.2 (a) (3)

The most elementary capacitor consists of two charged electrical plates separated by a narrow non-conducting medium. When one plate is positively charged and the other is negatively charged, electrical energy is held within the system. The larger the plates, the larger the capacity of the unit to hold energy. Connection of leads between the two plates will result in a fast discharge of current. Due care must be exercised when managing capacitors, so as to prevent shock from residual stored charge.

In application, capacitor plates may be tightly wound or wrapped in a circular or cylindrical fashion to effect very large plate sizes in a small volume. These tightly wound designs necessitate introduction of a non-conductive material between the plates, so as to eliminate the potential for inadvertent discharge. This insulating material can consist of paper, paste, or dielectric fluid.

Prior to 1979, PCBs were the dielectric fluid of choice for both large and small capacitors. However, air filled capacitors have application in specific electrical circuits.

All identified capacitors currently located within in Buildings 776/777 are air cooled, with the exception of the Inductotherm units specified below. This determination was made by virtue of their circuit configuration and review by an experienced, licensed electrician. Twenty (20) liquid dielectric filled capacitors are present in Building 776's penthouse.

***Inventory of PCB items identified in this reconnaissance***

These PCB items were identified in the Buildings 776/777 reconnaissance:

- Two Inductotherm units containing two capacitors each, Pyranol filled, 2 gallons each dielectric volume, total four capacitors, total 8 gallons dielectric volume
- Two electron beam welder units, enclosed in shrouds, plutonium contaminated, step-up type transformer (from 440 V input to 150,000 V output). Liquid oil is present near fill spout; evidence of leakage from seams or welds was not observed. Nameplates unobservable, process knowledge indicates the units were manufactured prior to 1979.
- Three rectifiers, liquid dielectric filled. Nameplates unobservable, process knowledge indicates the units were manufactured prior to 1979.
- Signal generating transformer or voltage regulator, containing likely less than one-gallon liquid dielectric. Nameplates unobservable, process knowledge indicates the unit was manufactured prior to 1979.
- Two transformers in penthouse, enclosed in shrouds. Nameplates unobservable, process knowledge indicates the units were manufactured prior to 1979.
- Twenty capacitors in penthouse, enclosed in shrouds. Nameplates unobservable, process knowledge indicates the units were manufactured prior to 1979.
- Hydraulic oil units, possibly containing PCBs.

Several of these items (to include the Inductotherm units, the signal generating transformer, and the welders) had been identified either in Buildings 776/777's Reconnaissance Level Characterization Report or via other walk-downs. Other items (such as all items in the penthouse) were identified during this reconnaissance.

Several items were labeled as "PCB" or described as PCB Containing in prior reconnaissance, although such labeling or presumptive identification is not required under 40 CFR § 761. These items are:

- A small float switch.
- Air cooled capacitor bank (approximately 20 capacitors) in Room 154.
- Capacitor bank outside of Room 418 characterized as PCB in prior reconnaissance; inspection established that no PCB capacitors are present within the shroud.

Approximately seventy-five transformers and capacitors were identified as being air–cooled. This classification is important, as an earlier building walk-down had incorrectly presumed that these items

contained PCBs. Many of these air-cooled transformers are housed in metallic shrouds, obscuring nameplate information and prompting the misidentification.

This reconnaissance's identifications are based on:

1. process knowledge evaluations by an experienced licensed electrician, James H. Williams, License No. 4083, supported by
2. the American Electrician's Handbook[4], and
3. PCB concentration presumption requirements found in 40 CFR § 761, and
4. Nameplate information on each item, where visible, and
5. The characteristics of air cooled and dielectric cooled transformers as presented above.

Except for the transformers and capacitors in the Building 776 penthouse, all of these PCB items in Buildings 776/777 are located in Radiologically Contaminated Areas, and must be presumptively managed as if they are themselves radiologically contaminated. These areas are currently slated for deactivation and decommissioning as articulated in Buildings 776/777's DOP.

***Regulatory framework for PCBs under TSCA and CERCLA***

As directed by Congress, the USEPA has promulgated regulations for the management of transformers, capacitors, and PCB items during use, storage, and disposal. However, PCBs are also hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 U.S.C.A. §§ 9601 to 9675). Building's 776/777's Reconnaissance Level Characterization Report and Decommissioning Operations Plan, both generated pursuant to CERCLA, established that PCB items are present in the buildings.

Under TSCA, PCB items no longer in service must be placed, within thirty days, into properly engineered storage units. Their eventual disposal, by techniques such as incineration, dechlorination, or secure chemical landfill, is required within one year.[5] Most of the PCB items identified in the Reconnaissance Level Characterization Report and this reconnaissance have no foreseeable re-use.

EPA's published policy for management of PCB items at active, operational sites subject to CERCLA is problematic. Where CERCLA requires remedial actions at completion to meet all Applicable or Appropriate and Relevant Requirements (ARAR)s (cf. CERCLA § 121 (c) (2) (A) (ii)), USEPA's ARARs guidance for PCBs at CERCLA sites does not focus on PCB items which are in–use, out–of–service, or in-storage for disposal.[6] Published USEPA guidance instead focuses on management of PCBs at CERCLA sites with historic PCB spills.

The statutory language of CERCLA provides the necessary guidance for the application of TSCA's requirements of PCB items at RFETS. Relevant CERCLA statutory excerpts are:

1. CERCLA § 121 (c) (2) (A) (ii) requires that remedial actions attain "at the completion of the remedial action, a level or standard of control for such hazardous substance or pollutant or contaminant which at least attains which legally applicable or relevant and appropriate standard, requirement, criteria, or limitation."

---

[4] American Electricians' Handbook, 1996, Croft, T. and Summers, W. I., editors, McGraw – Hill, NY

[5] For complete instructions on PCB management, the reader is referred to RFETS' "Polychlorinated Biphenyls Management Plan", found on the RFETS intranet site http://rfetshp/environmental, ELT Guidance Number 32

[6] USEPA, 1990, Guidance on Remedial Actions for Superfund Sites With PCB Contamination, OSWER Dir. No. 9355.4-01

2. CERCLA § 121 (c) (4) allows selection of a remedial action not equivalent to a legally applicable or relevant and appropriate standard, requirement, criteria, or limitation as required by paragraph (2) (see Bullet 1 immediately above) if:

   " . . . the remedial action selected is only part of a total remedial action that will attain such level or standard of control when completed;"

   " . . . compliance with such requirements is technically impracticable from an engineering perspective".

Clearly, management of PCB items during deactivation and decommissioning activities at RFETS can proceed using appropriate and relevant management practices, given that:

1. Since all PCB items will be removed prior to remedial action completion there is no need to pre–emptively remove these PCB items prior to their currently slated removal time as established in Buildings 776/777's DOP (cf. Bullet 1 immediately above). There is no need for pre-emptive removal and off – site disposal within one year, as prescribed by the TSCA regulations.
2. Management of the PCB items is only part of the total deactivation and decommissioning process at RFETS, so there is no need to pre–emptively remove these PCB items prior to their currently slated removal time (cf. Bullet 2 immediately above).
3. The existing Buildings 776/777 DOP has used best engineering practice to determine equipment deactivation and removal activities. Restructuring of the very refined DOP schedule to preemptively remove these PCB items is not a dictate of CERCLA (cf. Bullet 2 immediately above).

***Recommendations***

The complexity of the deactivation and decommissioning mission at RFETS practically ensures that additional PCB items will be discovered, not just in Buildings 776/77 but elsewhere on-site. For example, the presence of rooms that are currently inaccessible (such as "infinity rooms" both in 776/777 and other buildings on – site) nearly guarantees such discovery. The eventual disposal of these PCB items must be performed in compliance with all applicable law and regulation. However, CERCLA's statutory exemptions do not require pre-emptive removal of PCB items, as long as the exemption's obligations are met.

It is recommended that discussion be held with both LRA's at RFETS, Colorado Department of Public Health and the Environment and USEPA, so that the relevance of these statutory exemptions for all PCB items found during site-wide deactivation and decommissioning activities is acknowledged. In addition, LRA concurrence should be obtained for this interpretation of TSCA's substantive requirements under CERCLA:

- TSCA § 2605 establishes that PCBs should not be allowed to effect either human health or the environment.
- PCB items currently located within contaminated areas of Type 2 or Type 3 (such as Buildings 776/777) are currently segregated from the environment.
- RFETS shall apply the standard PCB Mark (cf. 40 CFR § 761) for all transformers and capacitors which need carry such a label.
- Additional PCB items which may be identified during deactivation and decommissioning (such as the rectifiers identified in 776/777), which need not carry the PCB Mark, will be pre-emptively labeled "PCB Remediation Waste".
- RFETS maintains that standard Personal Protective Equipment (PPE) and standard engineering practices used in the contaminated areas of Type 2 and Type 3 buildings protect human health from PCB items being held until deactivation and decommissioning activities.

- Pre-emptive removal of PCB items from contaminated areas of Type 2 and Type 3 buildings is not required, given CERCLA's § 121 (c) (4). The PCB items will be removed when expeditious, and/or at the time of deactivation and decommissioning.
- Any newly discovered PCB items in the non-contaminated areas of Type 2 buildings, as well as PCB items which may be discovered in Type 1 buildings or exterior to buildings, need be managed in full administrative and procedural compliance with the labeling, inspection, and engineering standards associated with PCBs in 40 CFR § 761. Importantly, as of the date of this reconnaissance, PCB items (except for ballasts and PCB bulk product materials) have not been identified in these areas.[7]
- All PCB items shipped from RFETS for off-site disposal must comply with all administrative and substantive requirements of TSCA.

[7] Building 991 is currently in the process of removing a PCB transformer.